

Research Report



Among the nearly 1,300 research projects and demonstrations it has supported, the Farming for the Future agricultural research program has funded many innovative studies. In 1990-91, a new Farming for the Future project is examining the use of sonic barriers to restrict the movement of triploid grass carp (above). The carp could one day be used to control vegetation in Alberta's 12,000 kilometres of open irrigation canals. However, a reliable means (possibly sonic barriers) must first be found to keep the carp in designated areas of irrigation canals.

Farming for the Future 1990-91 Projects

Agricultural research helps to pave the way to a sustainable future

From the start, Alberta's agricultural industry has been built on research and technology. The cold winters and short growing seasons of the prairies prompted farmers and researchers in the late 1800s and early 1900s to begin the laborious process of breeding early maturing, disease-resistant varieties of wheat and other crops.

Over the years, scientists have produced better and better varieties suited to the specific needs of Alberta's farmers. Their research has yielded important advances in all aspects of agriculture — livestock production, soil fertility and conservation, production of alternative crops, on-farm water management, pest control, food processing and marketing. And over the last decade, the Farming for the Future program has written its own vital chapter in this long history of invaluable agricultural research.

Farming for the Future is an Alberta Heritage Savings Trust Fund program which supports agricultural research and technology transfer. Its objectives of improving net

farm income and promoting the long-term viability of Alberta's agricultural industry were set when the program was first established in the late 1970s. They are still valid objectives today, over 10 years later.

To achieve its objectives, Farming for the Future established two grant programs: the Research Program and the On-Farm Demonstration Program. The former supports formal studies conducted by research scientists while the latter communicates new and innovative techniques directly to farmers.

The On-Farm Demonstration Program was established in 1982. As of April 1, 1990, it had provided over \$3.3 million for 683 demonstrations across Alberta. These demonstrations are co-operative ventures between farmers and Alberta Agriculture's extension staff. A total of \$600,000 has been allocated to support projects under this program in 1990-91.

Between 1979 and March 31, 1990, Farming for the Future had granted over

\$47.4 million to 549 projects under the Research Program. For 1990-91, 109 research projects (52 new and 57 renewed projects) have been awarded grants totalling \$3.98 million. They cover areas ranging from biological control of Canada thistle, to the development of a vaccine against bovine respiratory disease, to techniques for improving broiler chicken production, to the effects of international trade policy on the agricultural industry. A complete list of research projects supported in 1990-91 follows in this issue of Research Report.

These projects were selected from a total of 243 proposals as being the ones most likely to have the greatest benefits for Alberta's agricultural industry. "Choosing the best projects from so many fine proposals is always a difficult task," says Mr. Ben McEwen, Deputy Minister of Alberta Agriculture and chairman of the Farming for the Future Council. The Council is the program's gov-

(continued next page)

(continued from page 1)

erning body. It is composed of active producers and representatives of governmental and academic agencies.

"We have to make many tough decisions each year," says Mr. McEwen, "but we always keep in mind what's best for Alberta's producers and food processors. That's why Farming for the Future has supported so many practical and positive projects."

Farming for the Future's objectives take into account both the short-term and long-term needs of the industry. States Mr. McEwen: "Farmers have to meet the day-to-day challenges of managing their operations, but they also have to make their farms economically and environmentally sustainable. That's the reality of managing any farm.

Farming for the Future supports projects that can help farmers today and in the years ahead."

The program's list of successful results is "impressive," says Dr. Ralph Christian, executive director of Alberta Agriculture's Research Division. "Some that come to mind are: improved grain and oilseed varieties for Alberta conditions, alternative approaches for improving livestock nutrition, ways to reduce seepage from irrigation systems and improved tillage systems to help conserve valuable topsoil."

The program has supported projects which developed new ways of preserving the quality of our food products, new methods for controlling livestock diseases, new approaches to forecasting grasshopper outbreaks, a technique for splitting calf embryos

to produce identical twins and improved information on the beef price cycle. "And there are many, many more examples of the advances produced with the help of Farming for the Future," notes Dr. Christian.

"We can all be proud of Farming for the Future's record of performance," says Mr. McEwen. "It has been a sound investment of the Heritage Fund. The results from hundreds of Farming for the Future projects are helping to build a stronger agri-food industry and a strong Alberta."

Farming for the Future has continued the Alberta tradition of using research to improve productivity. The program is proving invaluable as Alberta farmers and food processors meet the challenges of the global marketplace with resourcefulness, innovation and a keen eye to the future.



RESEARCH PROGRAM PROJECT SUMMARIES – 1990-1991

PROJECT TITLE AND OBJECTIVE	RESEARCH MANAGER	INSTITUTION & LOCATION	FUNDING AWARDED
CEREALS AND OILSEEDS			
Breeding Regionally Adapted Canola Cultivars for Alberta Growing Areas <ul style="list-style-type: none"> to develop high yielding, disease resistant canola cultivars adapted to the Peace River region and to southern Alberta 	R.K. Downey	Agriculture Canada — Saskatoon	25,000
Evaluation and Development of Soft White Spring Wheats for Western Canada <ul style="list-style-type: none"> to develop high yielding soft white wheats with good resistance to disease and sprouting 	R.S. Sadasivaiah	Agriculture Canada — Lethbridge	75,000
Acceleration of Canola Variety Development for the Peace River and Southern Alberta Regions <ul style="list-style-type: none"> to develop canola varieties adapted to the Peace River region and to irrigated dryland conditions in southern Alberta 	D.L. Woods	Agriculture Canada — Beaverlodge and Lethbridge	195,000
Intensive Management Systems for Barley, Wheat, and Canola Production <ul style="list-style-type: none"> to determine the effects of fertilizers, plant growth regulators, pesticides and stand density on barley, wheat and canola yields 	D.C. Penney J.H. Helm	Alberta Agriculture — Edmonton and Lacombe	72,000
Understanding and Alleviating Green Seeds in Spring Canola: Impact of Increased Early Frost Tolerance on Degreening <ul style="list-style-type: none"> to assess frost tolerance during seed maturation in <i>Brassica napus</i>, <i>B. campestris</i>, and <i>B. juncea</i> and to identify the superior lines 	A.M. Johnson-Flanagan	University of Alberta — Edmonton	56,000
The Use of Microspore Culture to Evaluate Early Generation Hybrid Populations of <i>Brassica napus</i> <ul style="list-style-type: none"> to test the microspore system for genetically stabilizing early flowering and disease resistant lines in early generations of hybrid <i>B. napus</i> 	G.R. Stringam	University of Alberta — Edmonton	50,000
Genetic Sources of Herbicide Tolerance in Oats (<i>Avena sativa</i> L.) <ul style="list-style-type: none"> to identify new sources of genetic resistance to five major wild oat herbicides, and to transfer these genes, through breeding and selection, to the genetic backgrounds of adapted Canadian cultivars 	S. Kibite	Agriculture Canada — Lacombe	35,000

PROJECT TITLE AND OBJECTIVE	RESEARCH MANAGER	INSTITUTION & LOCATION	FUNDING AWARDED
Rapid Development of Blackleg Tolerant <i>B. napus</i> Canola Cultivars Using Biotechnology <ul style="list-style-type: none"> to collect and characterize a wide spectrum of virulent and avirulent isolates of blackleg which infect both Brassica and cruciferous weeds; and to develop a set of differentials to characterize the disease 	G.R. Stringam	University of Alberta — Edmonton	61,000
CANADIANA			
NOV 14 1990			
In vitro Selection for Resistance to <i>Alternaria brassicae</i> in Canola <ul style="list-style-type: none"> to select lines of Polish and Argentine canola for resistance to blackspot, caused by the fungus <i>Alternaria brassicae</i>, using <i>Alternaria brassicae</i>-toxin as a selection pressure 	J.P. Tewari	University of Alberta — Edmonton	50,000
Development of Winter Wheat Genotypes Resistant to Snow Molds and Low Temperatures <ul style="list-style-type: none"> to adapt double haploid biotechnology using anther culture for breeding cold hardiness and snow mold resistance into new winter wheat lines for the central and northern prairies 	D.A. Gaudet	Agriculture Canada — Lethbridge	27,000
CROP PROTECTION AND ENTOMOLOGY			
Quackgrass Control in Zero and Conventional Tillage Systems <ul style="list-style-type: none"> to assess the effects of precisely timed, low rates of glyphosate (Roundup) and sethoxydium (Poast) on quackgrass control 	K.N. Harker W.H. Vanden Born	Agriculture Canada — Lacombe and University of Alberta — Edmonton	56,000
Cultural and Chemical Control of Downy Brome in Winter Wheat <ul style="list-style-type: none"> to determine the time of establishment and effect of soil moisture and temperature on emergence of downy brome in winter wheat, and to test potential herbicides for selective control of downy brome 	R.E. Blackshaw	Agriculture Canada — Lethbridge	45,000
Feasibility of Long Term Grasshopper Management <ul style="list-style-type: none"> to evaluate the use of bran baits treated with low quantities of insecticide or <i>Nosema locustae</i> in large areas to reduce grasshopper populations 	M.G. Dolinski	Alberta Agriculture — Edmonton	53,000
Economic Assessment of Cabbage Maggot Damage in Canola <ul style="list-style-type: none"> to develop a system for measuring the economic impact of root maggots in canola by using exclusion cages 	G.C.D. Griffiths	Griffiths & Griffiths Ecological Consultants — Sherwood Park	33,000
Detection and Identification of Virulent Strains of <i>Leptosphaeria maculans</i> (Blackleg) Using Monoclonal Antibodies <ul style="list-style-type: none"> to produce monoclonal antibodies against the virulent strain of <i>L. maculans</i>; and to develop an enzyme-linked immunosorbent assay (ELISA) to rapidly detect and identify this fungus in canola and other plant tissues 	R. Stace-Smith	Agriculture Canada — Vancouver	36,000
Influence of Crop Management on Control of Russian Wheat Aphid <ul style="list-style-type: none"> to establish a set of management practices which will help moderate the damage done by the Russian wheat aphid 	R.A. Butts	Agriculture Canada — Lethbridge	78,000
Genetic Engineering of Crop Plants for Enhanced Resistance to Insect Pests and Plant Pathogens <ul style="list-style-type: none"> to determine the feasibility of using genetic engineering to enhance the resistance of crop plants to insect damage and invasion by plant pathogenic microorganisms 	A.A. Szalay	University of Alberta — Edmonton	85,000

PROJECT TITLE AND OBJECTIVE	RESEARCH MANAGER	INSTITUTION & LOCATION	FUNDING AWARDED
Evaluation of an Insect, <i>Ceutorhynchus litura</i>, as a Biological Control Agent for Canada Thistle • to assess the effectiveness of <i>C. litura</i> as a biological control of Canada thistle under field conditions and to test its ability as a carrier for Canada thistle rust disease	A.S. McClay	Alberta Environment — Vegreville	20,000
Evaluation of the Pirate Bug <i>Orius tristicolor</i> for Western Flower Thrips Control in Greenhouse Cucumbers and Peppers • to develop sampling procedures for and to evaluate the effectiveness of the pirate bug as a predator of western flower thrips in commercial greenhouse cucumber and pepper crops	M.Y. Steiner	Alberta Environment — Vegreville	22,000
Developing Synthetic Resistance to Luteoviruses, Potato Leafroll, Beet Western Yellows and Barley Dwarf Viruses • to evaluate each of the genes of potato leafroll virus for their potential as synthetic resistance genes for the luteovirus class of plant viruses	R.R. Martin	Agriculture Canada — Vancouver	43,000
Improving the Efficiency of Complementary RNA Techniques for Diagnosis of Potato Viruses and Viroid • to improve techniques for detecting potato viruses by measuring the concentration of potato virus X and potato virus S with DNA probes using the dot-hybridization assay method	C. Hiruki	University of Alberta — Edmonton	32,000
Ammonium Sulfate and the Efficacy of POAST (Sethoxydim) • to define the environmental conditions under which the fertilizer ammonium sulfate can enhance the activity of the herbicide POAST against a range of weeds	W.H. Vanden Born	University of Alberta — Edmonton	18,000
Role of Alfalfa Leafcutter Bee Associated Microflora in Chalkbrood Disease • to determine the role of leafcutter bee-associated microorganisms in chalkbrood disease	M.S. Goettel	Agriculture Canada — Lethbridge	44,000
Transfer of Russian Wheat Aphid Immunity From Triticale to Wheat • to identify the chromosome(s) involved in triticale's immunity to the Russian Wheat Aphid, and to transfer this immunity from triticale to wheat germplasm suitable for use in wheat breeding programs	J.B. Thomas	Agriculture Canada — Lethbridge	44,000
Evaluation of Varietal Differences in Yield Losses Due to Barley Leaf Diseases • to assess under field conditions the disease resistance and yield loss due to barley leaf diseases of different barley varieties	S.W. Slopek	Alberta Agriculture — Olds	38,000
FORAGES			
Yield and Quality of Pasture Grasses During Initial Spring Growth and Fall Regrowth • to determine how plant maturity, structure, and shape are related to the yield and quality of various pasture grasses	V.S. Baron J.R. King	Agriculture Canada — Lacombe and University of Alberta — Edmonton	34,000
Fall Management of Three Orchard Grass Cultivars Under Simulated Intensive Grazing • to evaluate how the timing of late-season grazing affects the winter hardiness and spring regrowth of three orchard grass cultivars	J.R. King	University of Alberta — Edmonton	33,000
Assessment of Winter Grazing on Rough Fescue Grasslands • to determine the feasibility of winter grazing pregnant cows on rough fescue grassland in the foothills region of Alberta	W.D. Willms	Agriculture Canada — Lethbridge	44,000

PROJECT TITLE AND OBJECTIVE	RESEARCH MANAGER	INSTITUTION & LOCATION	FUNDING AWARDED
Effect of Fall Cutting Date and Snow Cover on Time and Severity of Winter Kill in Orchard Grass • to quantify the winter hardiness of two types of orchard grass, 'Kay' and 'Mobite', and to devise an agronomic management package for their successful overwintering	J.R. King	University of Alberta — Edmonton	28,000
Salinity Tolerance of Forage and Turf Grasses • to develop agronomic management packages related to the salinity tolerance of 30 grass species grown in Alberta	R.C. McKenzie	Alberta Special Crops and Horticultural Research Center — Brooks	35,000
Improving Late Season Forage Regrowth in Spring and Winter Cereal Intercrops • to determine the winter cereals best suited to intercropping with spring cereals in order to improve late season pasture production	V.S. Baron	Agriculture Canada — Lacombe	40,000
IRRIGATION			
Development of an Automated Cost-Effective Surge Irrigation System • to develop an automated surge-flow surface irrigation system to provide precise intermittent application of irrigation water, increase irrigation efficiency, and save time	N. Foroud	Agriculture Canada — Lethbridge	28,000
Irrigation Suitability of Solonetzic Soil Associations in East-Central Alberta • to evaluate the irrigation suitability of several types of solonetzic and chernozemic soils in east-central Alberta by studying potential forage production, soil salinity and sodicity under various irrigation management regimes	D.R. Bennett	Alberta Agriculture — Lethbridge	22,000
Evaluation of a Sonic Fish Barrier • to modify, evaluate and test a sonic device to replace costly and impractical (since they can be plugged by weeds and debris) fish barrier screens	R.J. Soar	Lambda Technology Ltd. — Victoria	48,000
LAND RESOURCES AND ENGINEERING			
On Site Biotechnologies for Soil Conservation and Risk Management on Luvisolic Soils • to develop cropping systems which conserve soil, are economically sound, and use biological nitrogen fixation, where practical, to supply nitrogen	W.B. McGill	University of Alberta — Edmonton	38,000
Annual Legume Plowdown to Replace a Cultivated Fallow • to develop guidelines for the use of annual legume plowdown in order to maintain and improve soil nitrogen and organic matter levels	T.L. Jensen	Alberta Agriculture — Edmonton	48,000
Dryland Farming System Research for South and South Central Alberta • to develop an economic crop production system for the six soil areas in southern and south-central Alberta	R.H. McKenzie	Alberta Agriculture — Lethbridge	70,000
Maximizing Meadow Brome-grass Pasture Yield Through Optimum Fertilizer Nitrogen Management • to compare the efficiency of two nitrogen fertilizers (urea and ammonium) applied to meadow brome-grass in early spring, and to evaluate the influence of time of application on this efficiency	S.S. Malhi	Agriculture Canada - Lacombe	33,000

PROJECT TITLE AND OBJECTIVE	RESEARCH MANAGER	INSTITUTION & LOCATION	FUNDING AWARDED
In-Bin Grain Moisture Monitoring • to test the feasibility of using soil moisture sensors to monitor the moisture content of grain in storage bins, and to establish whether the expansion/contraction of a grain mass can be used as a reliable indication of moisture content	J.J. Leonard	University of Alberta — Edmonton	8,000
Deep Tillage Tools for Soil and Water Conservation • to determine the effect of deep tilling on soil and water conservation, and to assess its long-term benefits	D.S. Chanasyk	University of Alberta — Edmonton	44,000
The Impact of Grazing on Rangeland Hydrology • to study the hydrologic impact of grazing on the sloped areas of the foothills fescue rangelands	D.S. Chanasyk	University of Alberta — Edmonton	42,000
Management of Farm Dugouts as Water Supplies; Use of Lime for Algal Control • to develop a program for the use of lime to provide clean water in farm drinking-water dugouts	E.E. Prepas	University of Alberta — Edmonton, and Alberta Forestry, Lands and Wildlife — Peace River	28,000
Effect of Feeding, Flooring and Ventilation on Size and Character of Airborne Particles in Pig Housing • to study the behavior of airborne particles in an environmentally controlled room containing no animals, pen partitions, feeders, or slatted floors	J.R. Feddes	University of Alberta — Edmonton	43,000
The Pulse Bander: A Conservation Tool for Forage Production • to study the effect of pulse banding fertilizers into established grass cover in order to improve productivity and conserve soil moisture	M.J. Rowell	Norwest Soil Research Ltd. — Edmonton and Agriculture Canada — Lacombe	24,000
Effects of Super Absorbent Polymers on Soil Water Related Properties and Crop Yield • to determine the effects and economic benefits of several of the most effective polymers used to enhance soil moisture characteristics; and to determine the longevity of the polymers in the soil mixture	C. Chang	Agriculture Canada — Lethbridge	23,000
Amelioration of Soil Compaction Problems Through Appropriate Tillage • to determine the effects of soil compaction on: draft, fuel, and energy requirements for different tillage and subsoiling practices; infiltration rate and runoff before and after tillage treatments; and to assess the cost effectiveness of ameliorative treatments	C. Chang	Agriculture Canada — Lethbridge	30,000
Zero and Conventional Tillage; Soil Organic Matters; Fate of Nitrogen; Crop Yield; and Environmental Implications • to continue five long-term field experiments on yield and nitrogen-uptake by adjusting the methods of tillage and the handling of straw	M. Nyborg	University of Alberta — Edmonton	33,000
Identification of Quality Criteria for Prairie Soils • to quantify the relationship between soil productivity and various specific, measurable soil properties	H.H. Janzen	Agriculture Canada — Lethbridge	18,000

NON-RUMINANTS

Influence of Dietary Fat Level and Composition on Protein Deposition in the Rapidly Growing Broiler • to assess the effects of diets varying in the level and composition of dietary fat on net protein and energy gain, and to assess the underlying rates of protein synthesis and degradation	V.E. Baracos	University of Alberta — Edmonton	36,000
--	--------------	-------------------------------------	--------

PROJECT TITLE AND OBJECTIVE	RESEARCH MANAGER	INSTITUTION & LOCATION	FUNDING AWARDED
Effect of Immunization of Gilts Against Paternal Antigens on Reproductive Performance <ul style="list-style-type: none"> to determine how pre-immunizing young gilts against antigens from boars affects conception rate, ovulation rate and embryo survival 	R.J. Christopherson	University of Alberta — Edmonton	48,000
Post-Weaning Nutrition of the Pig: Nutrient Interactions Among Dietary Components <ul style="list-style-type: none"> to determine the optimum levels of digestible protein, amino acids, fat and fiber in diets of early-weaned pigs 	W.C. Sauer	University of Alberta — Edmonton	42,000
Nutritional Significance of Biologically Enriched Egg Yolk with Omega-3 Fatty Acids <ul style="list-style-type: none"> to develop eggs and egg products biologically enriched with Omega-3 fatty acids by including full-fat canola, flax seed or fish products in laying-hen diets 	J.S. Sim	University of Alberta — Edmonton	38,000
Evaluation of Full-Fat Canola and Barley in Commercial Broiler Diets <ul style="list-style-type: none"> to compare high and low energy diets containing 60% Barcan with conventional wheat/corn/soybean meal diets used in commercial production 	R.E. Grimson	Lakeside Feeders Ltd. — Brooks	in progress
The Formulation of Pig Diets on the Basis of the Digestible Amino Acid Supply <ul style="list-style-type: none"> to determine the various advantages of formulating swine rations on the basis of ideal amino acid digestibility values 	W.C. Sauer	University of Alberta — Edmonton	22,000
The Evaluation of Vitamin E and Vitamin A in Horses <ul style="list-style-type: none"> to investigate high pressure liquid chromatographic methods, normal blood plasma concentration, and the influence of age on the status of vitamins A and E in horses 	B.R. Blakley	Western College of Veterinary Medicine — Saskatoon	17,000
A Practical Simulation Model of the Responses of Gestating and Lactating Sows <ul style="list-style-type: none"> to develop software to model gestation and lactation in sows 	B.A. Young	University of Alberta — Edmonton	47,000
Improving Broiler Chicken Production Efficiency Through Short-Term Feed Restriction and Photoperiod Management <ul style="list-style-type: none"> to determine how much the efficiency of broiler chicken production can be increased by altering the growing environment 	F.E. Robinson	University of Alberta — Edmonton	40,000
A Histomorphometric Study of the Skeleton of Broiler Chickens Kept Under Different Lighting Regimes <ul style="list-style-type: none"> to identify any changes in broiler skeletons related to lighting programs or housing and which may correlate with a higher incidence of twisted leg syndrome 	C. Riddell	Western College of Veterinary Medicine — Saskatoon	8,000
Detection of Stress Susceptible Pigs by Blood Marker Electrophoresis <ul style="list-style-type: none"> to evaluate the potential usefulness of using genetic blood markers to identify pigs subject to Porcine Stress Syndrome 	A.C. Murray	Agriculture Canada — Lacombe	35,000
PROCESSING AND MARKETING			
Use of Biotechnology to Develop Innovative Systems for Preservation of Meats <ul style="list-style-type: none"> to select and develop strains of bacteria that will inhibit spoilage and disease-causing bacteria in meats 	M.E. Stiles	University of Alberta — Edmonton	38,000

PROJECT TITLE AND OBJECTIVE	RESEARCH MANAGER	INSTITUTION & LOCATION	FUNDING AWARDED
Comparative Evaluation of Commercial Milk Coagulants for Increased Cheese Production Efficiency and Quality <ul style="list-style-type: none"> to study the qualitative and quantitative proteolytic characteristics of milk clotting enzymes in commercial coagulants used in Alberta 	F.H. Wolfe	University of Alberta — Edmonton	33,000
Macroeconomic Impacts on Canadian Agricultural Prices <ul style="list-style-type: none"> to assess the impact of macroeconomic forces on prices paid by producers as well as on the prices they receive and the resulting impact on agricultural terms of trade 	W.L. Adamowicz	University of Alberta — Edmonton	17,000
Analysis of Alberta Honey Composition to Aid Honey Exports <ul style="list-style-type: none"> to establish quality factors in Alberta honey samples including detailed sugar composition, enzyme levels, the amino acid proline, moisture and acidity, and ash levels 	P. Sporns	University of Alberta — Edmonton	32,000
Economic Feasibility of International Trade in Feedgrains Between Alberta and the Northwestern U.S.A. <ul style="list-style-type: none"> to assess the economic feasibility of exporting barley from Alberta to the U.S. given price and cost conditions characteristic of the 1980s 	M.L. Lerohl	University of Alberta — Edmonton	16,000
Evaluation of the Capital and Credit Needs of Alberta Farmers <ul style="list-style-type: none"> to develop a farm capital and credit model to estimate capital and credit needs of Alberta farmers over the next five years 	R.W. Ashmead	AgriTrends Research Inc. — Calgary	14,000
Frying Performance of Canola Fats and Their Effects on Convenience Food Quality <ul style="list-style-type: none"> to evaluate the frying performance of canola fats and commonly used frying fats; and to assess their effect on the quality of convenience foods using sensory, chemical and instrumental methods 	Z.J. Hawrysh	University of Alberta — Edmonton	35,000
The Effects of Spray-Chilling on Beef Quality and Spoilage <ul style="list-style-type: none"> to determine the effects of the duration of intermittent water sprays on carcass shrink and on muscle quality, purge loss and bacterial spoilage of boxed beef 	G.G. Greer	Agriculture Canada — Lacombe	20,000
Estimation of Farm Equipment Depreciation With Market Data, and Assessment of Related Investment Risk <ul style="list-style-type: none"> to assess published information on depreciation rates and farm equipment prices, and to identify the types and risks of different farm equipment asset portfolios 	G.A. Mumey	University of Alberta — Edmonton	13,000
An Analysis of Farm Structure in Alberta at a Sub-Provincial Level <ul style="list-style-type: none"> to determine the physical and financial characteristics of Alberta's agricultural regions and how they relate to the policies and goals of the agri-food sector 	W.J. Schissel	Alberta Agriculture — Edmonton	36,000
The Economics of Agricultural Chemical Use in Prairie Agriculture: Productivity and Environmental Impacts <ul style="list-style-type: none"> to document the use of agricultural chemicals on the prairies; and to analyze the production, productivity impacts, social benefits and costs of increased chemical usage 	T.S. Veeman	University of Alberta — Edmonton	39,000
Sulfonamide Immunoassays for Antibiotic Screening of Milk <ul style="list-style-type: none"> to develop antibody tests for sulfonamide residues in milk, and to study the reaction of sulfonamides with lactose 	P. Sporns	University of Alberta — Edmonton	28,000
An Economic Analysis of Alternative Cropping Decision Models Under Uncertainty <ul style="list-style-type: none"> to conduct an economic evaluation of alternative cropping systems under Alberta dryland farming conditions 	L. Bauer	University of Alberta — Edmonton	25,000

PROJECT TITLE AND OBJECTIVE	RESEARCH MANAGER	INSTITUTION & LOCATION	FUNDING AWARDED
Analysis of Risk and Returns in Hog Finishing • to generate information about investing in hog production	L. Bauer	University of Alberta — Edmonton	18,000
Canadian Agriculture and GATT: An Economic Analysis of Article XI • to analyze the economic effects on Canadian agriculture of provisions contained in Article XI of the General Agreement on Tariffs and Trade (GATT), and to document the historical evolution of selected proposals for change in the current provisions	M.M. Veeman	University of Alberta — Edmonton	27,000
An Economic Analysis of Risk Management Strategies for Alberta Beef Feeders • to provide an indepth analysis of sources of risk in cattle feeding and an analysis of techniques which may be useful in managing that risk	F.S. Novak	University of Alberta — Edmonton	25,000
The Effect of Dietary Vitamin E on Beef Quality and Shelf Life • to determine the effect of dietary vitamin E on red color in beef cuts, and to evaluate the relevancy of this finding to both the cattle feeding and packing industries in Alberta	B.E. Thorlakson	Animal Research International — Airdrie	36,000
Flavor Quality Evaluations of Processed Saskatoon Berries • to evaluate, using sensory and instrumental methods, the effects of several commercial processing methods on the quality of saskatoon berry flavor	Z.J. Hawrysh	University of Alberta — Edmonton	23,000
Microbial Quality and Safety of Microwaved Beef Cuts • to determine the microbial quality of fresh meats cooked by microwave at different power levels, and to assess the safety of fresh meats inoculated with indicator bacteria and stored under conditions simulating good and abusive storage	M.E. Stiles	University of Alberta — Edmonton	17,000
Analysis of Commercial Barriers to Increase Domestic Utilization of Mid-Protein Feed Ingredients in Alberta • to characterize the market and distribution infrastructure on a regional and international basis for "mid-proteins", such as canola and cottonseed meal, grown in or imported into Alberta as feed ingredients	S.J. Campbell	AgriTrends Research Inc. — Calgary	36,000
Analysis of Production Costs for Farmer Owned Feed Manufacturing Facilities • to collect data on the total costs of operating producer-owned feed manufacturing plants in Alberta	A.W. Anderson	University of Alberta — Edmonton	18,000
Extension of Chilled Pork Storage Life to Facilitate Sea Transport to and Distribution Through Remote Markets • to determine the optimum carbon dioxide concentration which will allow maximum storage life for chilled pork	L.E. Jeremiah	Agriculture Canada — Lacombe	30,000

RUMINANTS

Association of Respiratory Tract Colonization with Adherence of <i>Pasteurella haemolytica</i> -AI to Epithelial Cells • to determine if an association exists between colonization of the bovine respiratory tract by <i>Pasteurella haemolytica</i> and increased <i>in vitro</i> adherence of this bacterial species to bovine oropharyngeal epithelial cells	J.W. Costerton	University of Calgary — Calgary	25,000
Comparison of Natural Service Fertility of Yearling and Two-Year Old Bulls • to compare the fertility of bulls under different breeding pressures	M. Makarechian	University of Alberta — Edmonton	7,500

PROJECT TITLE AND OBJECTIVE	RESEARCH MANAGER	INSTITUTION & LOCATION	FUNDING AWARDED
Development of a <i>Haemophilus somnus</i> Animal Model and Testing of Vaccine Components <ul style="list-style-type: none"> to develop a challenge model in calves which accurately reproduces the clinical symptoms, pathological features, and general disease progression of <i>H. somnus</i> infections as they are seen in natural field outbreaks; and to develop and test vaccines which would protect calves from developing <i>H. somnus</i> pneumonia and other <i>H. somnus</i> infections 	H.G. Deneer	Veterinary Infectious Disease Organization — Saskatoon	39,000
Viral Infection Dynamics in Pre-Weaned and Early Feedlot Beef Calves <ul style="list-style-type: none"> to determine the time sequence or dynamics of natural individual and multiple concurrent viral infections (IBRV, PI₃, BRSV, and BVDV) in post-weaned feedlot calves by low-impact serial serological testing 	L.D. Armstrong	Alberta Agriculture and University of Alberta — Edmonton	40,000
The Role of Anaerobic Rumen Fungi in Cellulose Digestion and Animal Nutrition <ul style="list-style-type: none"> to isolate the predominant rumen fungi found in ruminants fed a variety of common forage and/or concentrate diets; and to develop a profile of feed-dependent fungal colonization of ruminants in Alberta 	K.-J. Cheng	Agriculture Canada — Lethbridge and University of Calgary — Calgary	60,000
Use of Neutral Detergent Fibre in Dairy Cattle Diet Formulation <ul style="list-style-type: none"> to evaluate the effects of forage quality on the concentration of dietary neutral detergent fibre necessary to optimize rumen function and productivity of dairy cows 	K.A. Beauchemin	Agriculture Canada — Lethbridge	45,000
Effects of Oil Treatment of Grains on Rumen Digestion and Animal Performance <ul style="list-style-type: none"> to compare digestion of physically processed grain treated with specific levels of canola oil; and to assess the capacity of canola oil to alter the site of starch digestion in feedlot cattle 	K.-J. Cheng	Agriculture Canada — Lethbridge	27,000
Immunological Selection of Adjuvants <ul style="list-style-type: none"> to select substances which enhance immune response and are suitable for use in vaccines against cattle and swine respiratory diseases 	M. Campos	Veterinary Infectious Disease Organization — Saskatoon	40,000
Bovine Respiratory Vaccine Development and Field Testing <ul style="list-style-type: none"> to reduce economic losses caused by bovine respiratory disease (shipping fever) by developing better and more economical vaccines 	L.A. Babiuk	Veterinary Infectious Disease Organization — Saskatoon	50,000
Simulation Modelling of Winter Stress and Feed Requirements of Cattle <ul style="list-style-type: none"> to develop computer software which determines the nutritional and shelter requirements of cattle during Alberta winters 	B.A. Young	University of Alberta — Edmonton	25,000
Energetic Efficiency of Wapiti <ul style="list-style-type: none"> to determine how efficiently the energy available from seasonal native forages is used by wapiti for maintenance and weight gain 	R.J. Hudson	University of Alberta — Edmonton	30,000
Is Cereal Silage a Viable Alternative to Alfalfa Silage for Lactating Dairy Cows? <ul style="list-style-type: none"> to evaluate whole crop barley, oat and triticale silage as replacements for alfalfa silage in the rations of lactating dairy cows 	J.J. Kennelly	University of Alberta — Edmonton	45,000
Chewing and Reticular Motility and Digesta Passage From the Rumen <ul style="list-style-type: none"> to determine whether the amount of required chewing is the main factor limiting the voluntary feed intake of individual cattle fed lower quality rations 	G.W. Mathison	University of Alberta — Edmonton	36,000

PROJECT TITLE AND OBJECTIVE	RESEARCH MANAGER	INSTITUTION & LOCATION	FUNDING AWARDED
A Proposal to Investigate the Economic Impact of Respiratory Disease in the Feedlot • to develop an assessment package for the economic impact of bovine respiratory disease (shipping fever) in the feedlot, and to determine the physical and economic performance of calves treated for an early fever	G.K. Jim	Feedlot Health Management Services — Okotoks	50,000
Nutritional Strategies to Promote Lean Growth of Lambs • to determine the effects of dietary protein and energy on the growth, wool production and carcass characteristics of lambs	K.A. Beauchemin	Agriculture Canada — Lethbridge	40,000
Physical and Chemical Factors Regulating Forage Intake and Digestibility by Ruminants • to determine the inter-relationship between various chemical and physical characteristics and voluntary intake and digestibility, and to develop simple laboratory analyses of detergent fibre as predictors of the nutritive value of forages	L.M. Rode	Agriculture Canada — Lethbridge	40,000
Relationship Between Body Size, Body Condition, and Fat Reserves in Beef Cows • to determine the relationships between tissue fat reserves, body condition and winter feed requirements of Continental- and British-type cows in order to help develop a practical feeding system for wintering beef cows	L.M. Rode	Agriculture Canada — Lethbridge	40,000
Hormonal Manipulation in Calves to Improve Their Growth Rate • to determine if immunizing calves against somatostatin enhances their growth rate and feed utilization efficiency, and to study the hormonal mechanism changes caused by this immunization	G.J. Mears	Agriculture Canada — Lethbridge	45,000
Development of Integrated Pest Management for Stable Flies in Drylots • to develop integrated pest management guidelines for the stable fly based on its seasonal changes in population density, attack rates, resting sites and breeding sites	T.J. Lysyk	Agriculture Canada — Lethbridge	45,000
Zinc Metallothionein • to determine zinc levels in animal blood by developing procedures to perform reverse phase liquid chromatography and atomic absorption spectrophotometry, thereby assisting veterinarians and nutritionists to evaluate the necessary level of dietary zinc	B.E. Beck	Alberta Agriculture — Edmonton	17,000
Preslaughter Stress in Cattle II: Management of Preslaughter Stress to Improve Carcass Yield and Grade in Beef Cattle • to use preslaughter electrolyte treatments along with measurements of blood in market weight cattle to identify and treat preslaughter stress	A.L. Schaefer	Agriculture Canada — Lacombe	30,000
SPECIAL CROPS			
Safflower Management for Optimizing Yield and Quality • to evaluate safflower management techniques in order to prepare a detailed safflower production package	H.H. Muendel B.A. Roth	Agriculture Canada — Lethbridge and Alberta Agriculture — Lethbridge	61,000
Adaptability and Agronomic Practices of Herbs, Spices and Essential Oil Crops for Alberta • to determine agronomic practices for commercial production of herbs and spices in Alberta	R.G. Gaudiel	Alberta Special Crops and Horticultural Research Center — Brooks	25,000

PROJECT TITLE AND OBJECTIVE	RESEARCH MANAGER	INSTITUTION & LOCATION	FUNDING AWARDED
Salinity and Cold Tolerance of Ornamental Trees • to develop reliable recommendations under field conditions for salinity and cold tolerance of several species of trees and shrubs grown in Alberta	R.C. McKenzie	Alberta Special Crops and Horticultural Research Center — Brooks	17,000
Overwintering Container Stock: How Dormancy Relates to Root and Shoot Cold Hardiness • to characterize factors controlling root hardiness; and to determine the relationship between dormancy and shoot and root cold hardiness	H.M. Mathers	Alberta Special Crops and Horticultural Research Center — Brooks	500
Commercial Adaptability, Feasibility, and Management Practices of Selected Essential Oil and Spice Crops in Alberta • to evaluate and determine the commercial adaptability of spice crops using commercial equipment for establishment, maintenance, harvesting, and processing operations	R.G. Gaudiel	Alberta Special Crops and Horticultural Research Center — Brooks and Alberta Agriculture — Lethbridge	39,000
Increasing the Yield of Field and Greenhouse Cucumbers With Mycorrhizal Fungi • to determine the extent to which vesicular-arbuscular mycorrhizal (VAM) fungi can be used to enhance the growth, development and yield of greenhouse and field-grown cucumbers	N.R. Knowles	University of Alberta — Edmonton	40,000
Irrigation Management Profiles for Potato Cultivars Grown in Southern Alberta • to develop irrigation management schemes for potato cultivars currently and potentially important to the potato industry in southern Alberta	D.R. Lynch	Agriculture Canada — Lethbridge	27,000

**For computer access to more information on projects supported by
Farming for the Future, call:
The Ag-Research BBS (403) 438-2209 (dataline)**

Research Report is published by the Research Division of Alberta Agriculture. Permission to reproduce articles contained in **Research Report** is granted provided appropriate credit is given to the source. Any comments or requests regarding this publication should be directed to: Editor, **Research Report**, Research Division, Alberta Agriculture, 7000-113 Street, Edmonton, Alberta, T6H 5T6

Farming for the Future is administered by the **Farming for the Future Council**. The Council has 15 members, including producers, scientists and provincial and federal government representatives. Further information about the Council or about **Farming for the Future** can be obtained from Alberta Agriculture, Research Division, #202, 7000-113 Street, Edmonton, Alberta, T6H 5T6